

Network Features

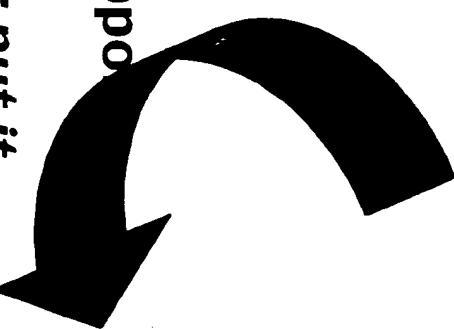
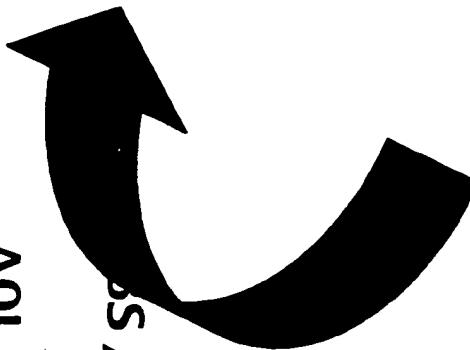
... plug and play interconnect...

... intuitive interfaces ...

... Internet capable ...

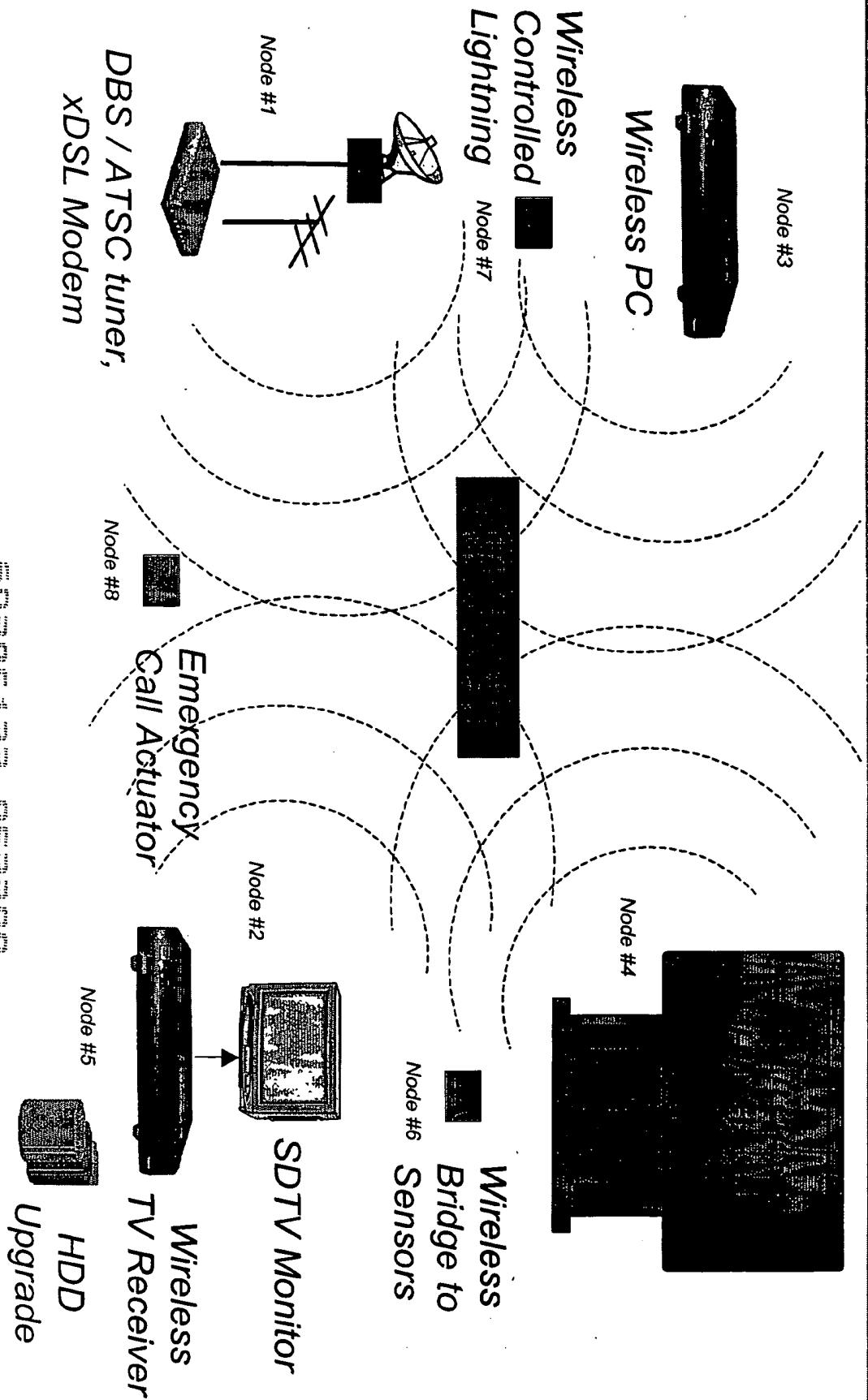
... IS / ATSC / xDSL and "open cable" support

... AOL compatible – "make it easy to use; put it
everywhere" ...



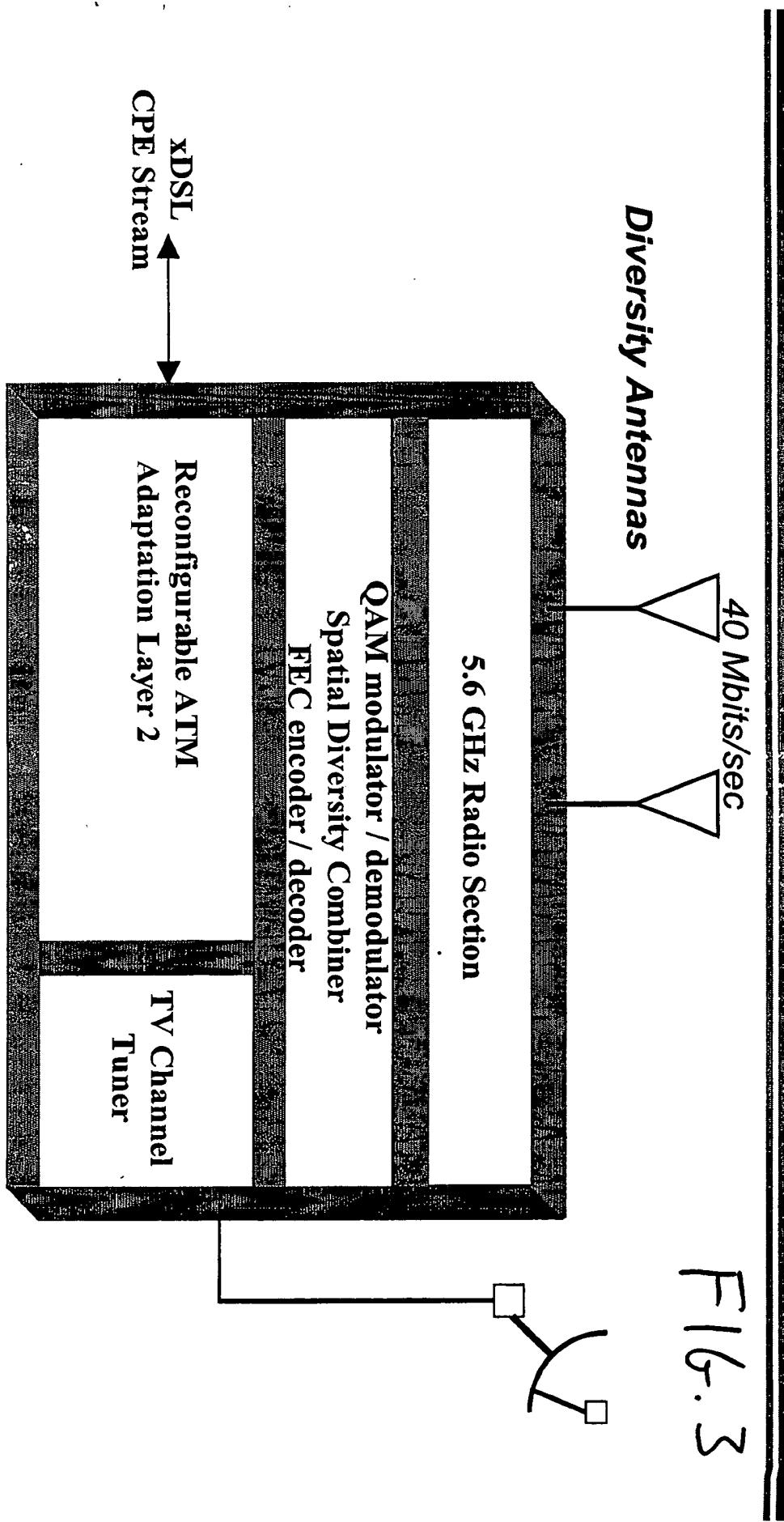
F/16

The Network FIG. 2



Broadband Home Wireless Portal

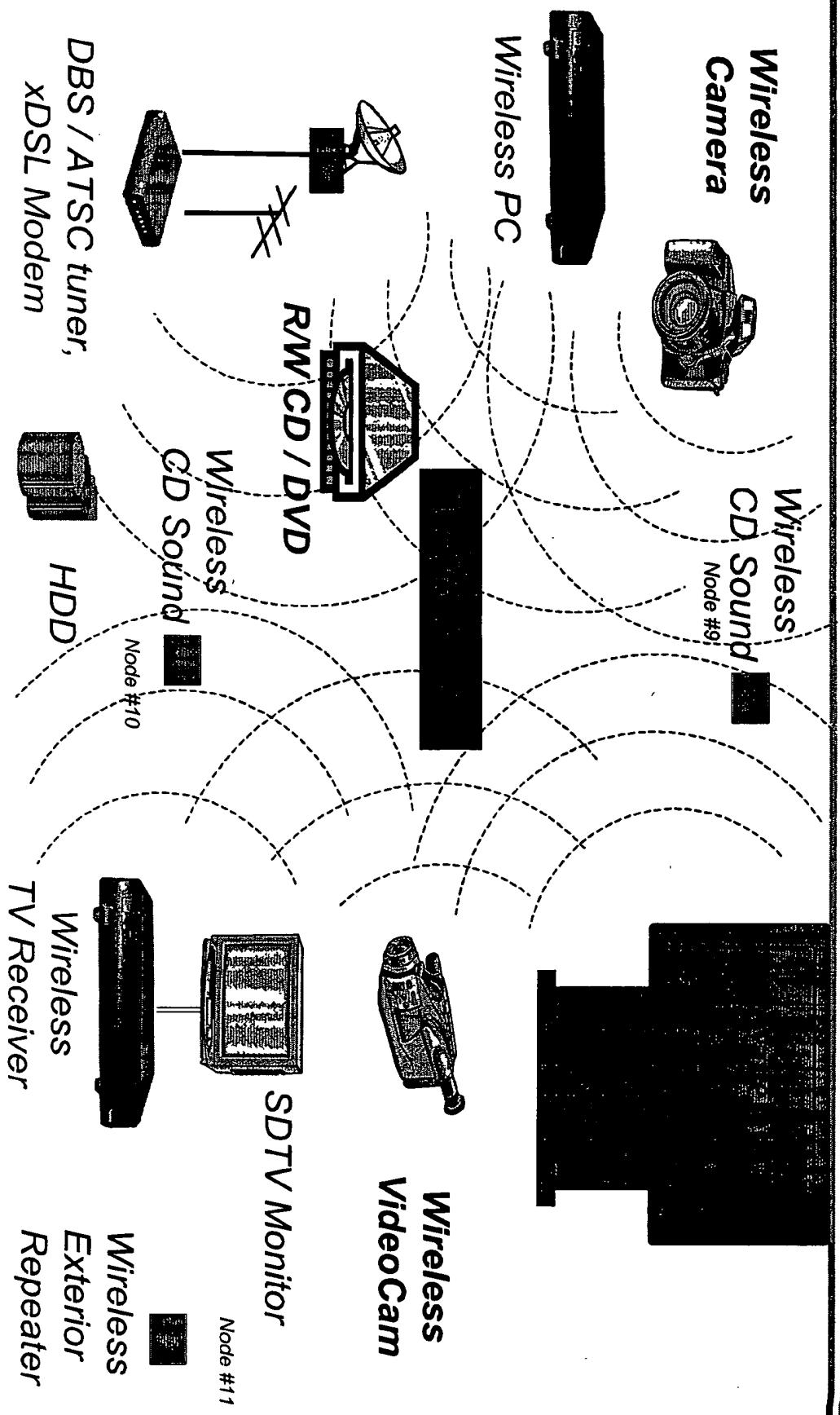
F16.3



HDD Enables Home Services *F16.4*

- The HDD becomes the NATURAL repository for still images and video ... wirelessly accessible from TVs and PCs
- » Enables PVR
 - time shift viewing
 - snap-shot editing / print ordering / picture email
 - video-clip editing / video email
 - datacasting / e-commerce / impulse purchasing
 - indexing by video content / video archiving
- » Support service access via xDSL and / or satellite for home management systems

Expanded Network FIG. 5

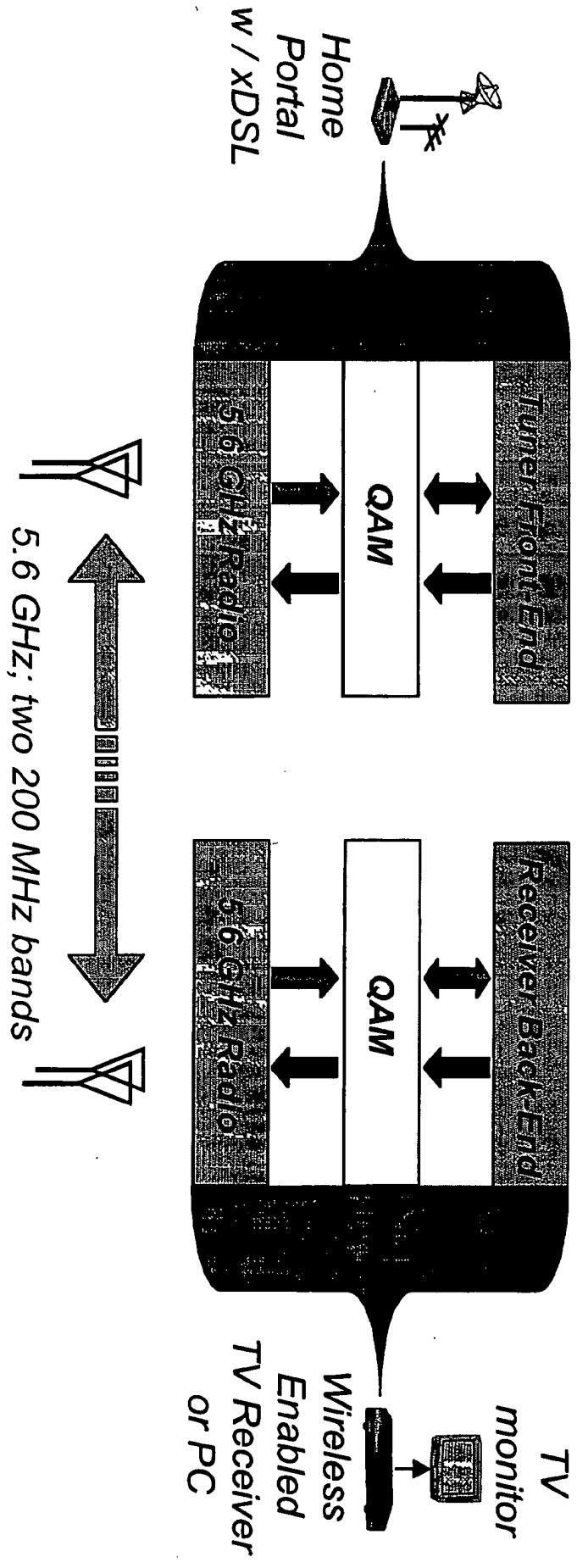


In-Home Architecture F16.6

■ Existing Receiver [STB] Circuits

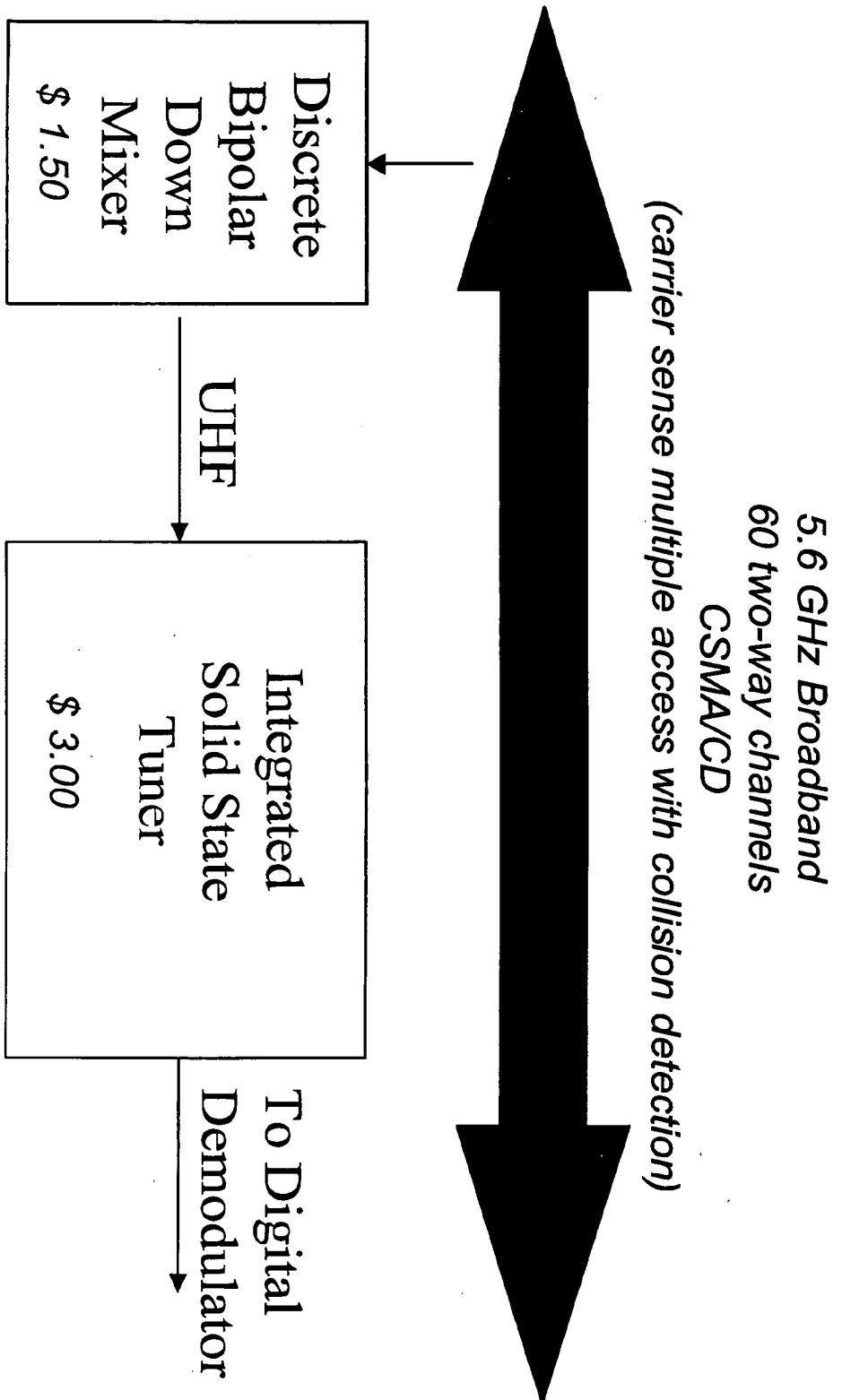
■ New RF Circuits

□ New Logic Circuits



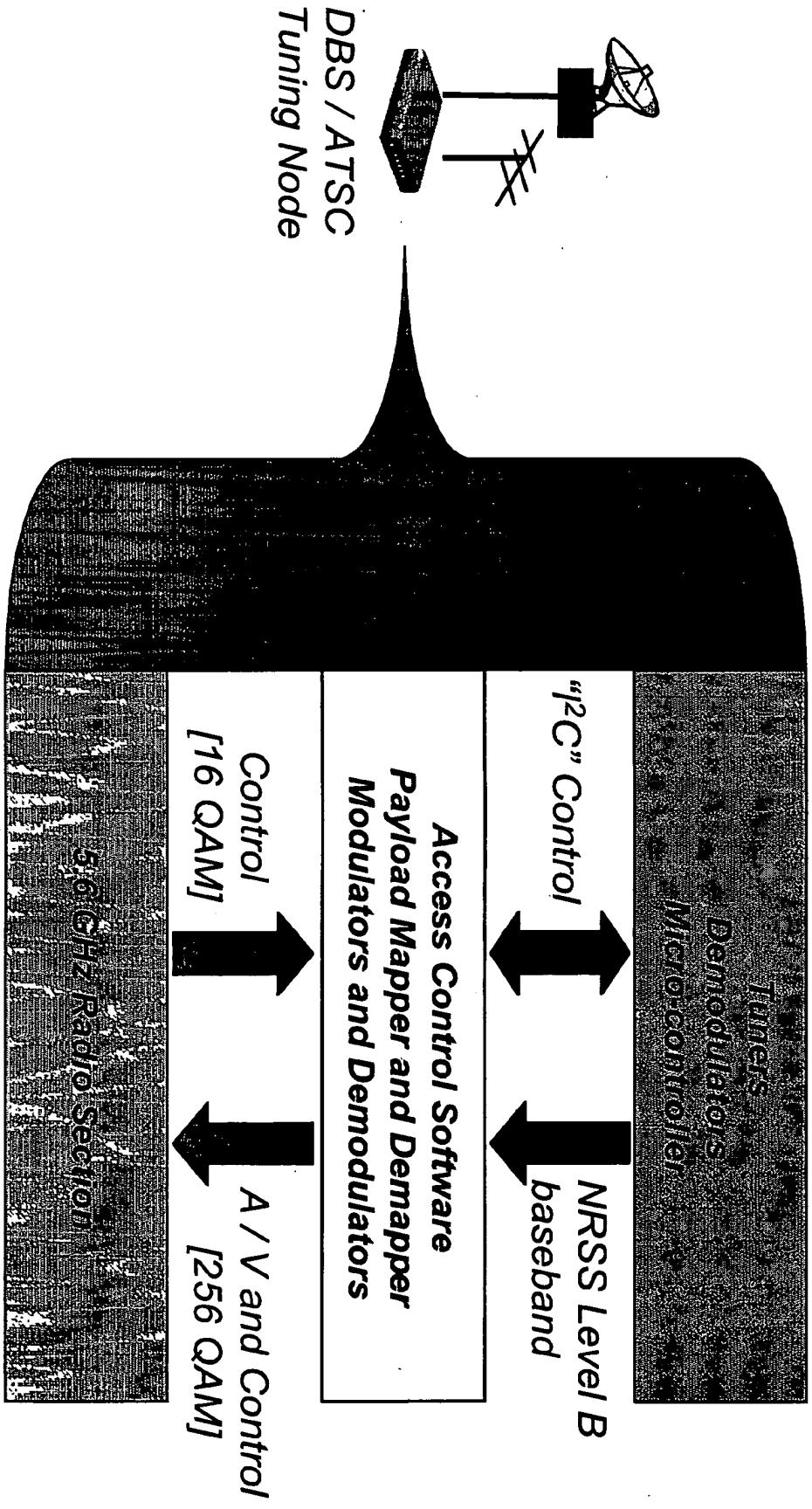
RF Radio Architecture

Fig 1



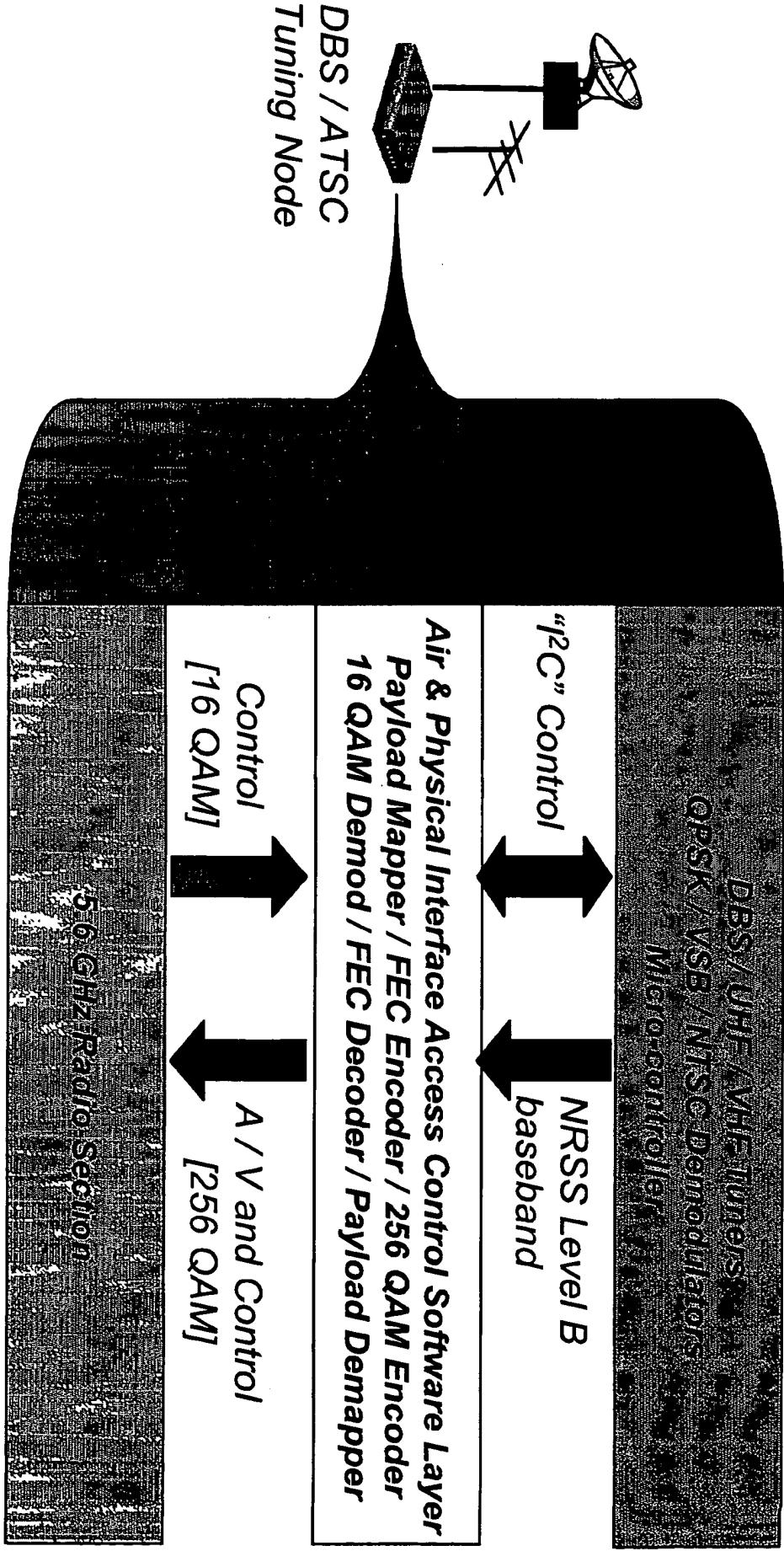
DBS / ATSC Tuner Node

F168



DBS / ATSC Tuner Node

F16. 9



Architecture

Fig. 10

5.6 GHz Broadband 45 two-way channel pairs

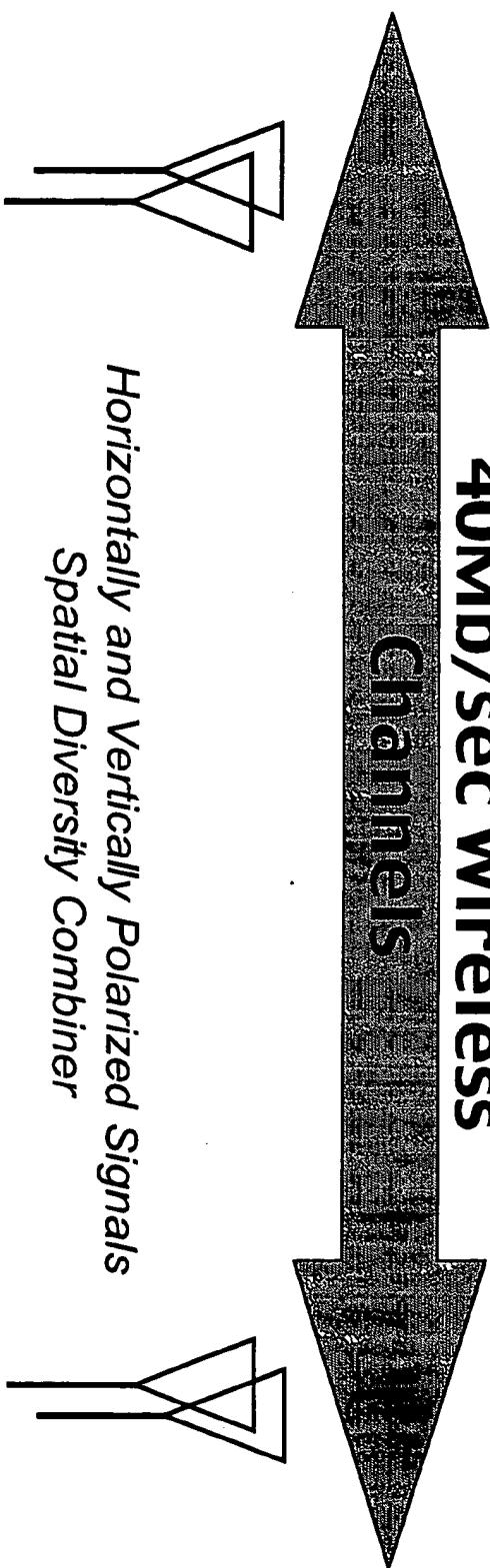
CSMA/CD

carrier sense multiple access with collision detection

40Mb/sec Wireless

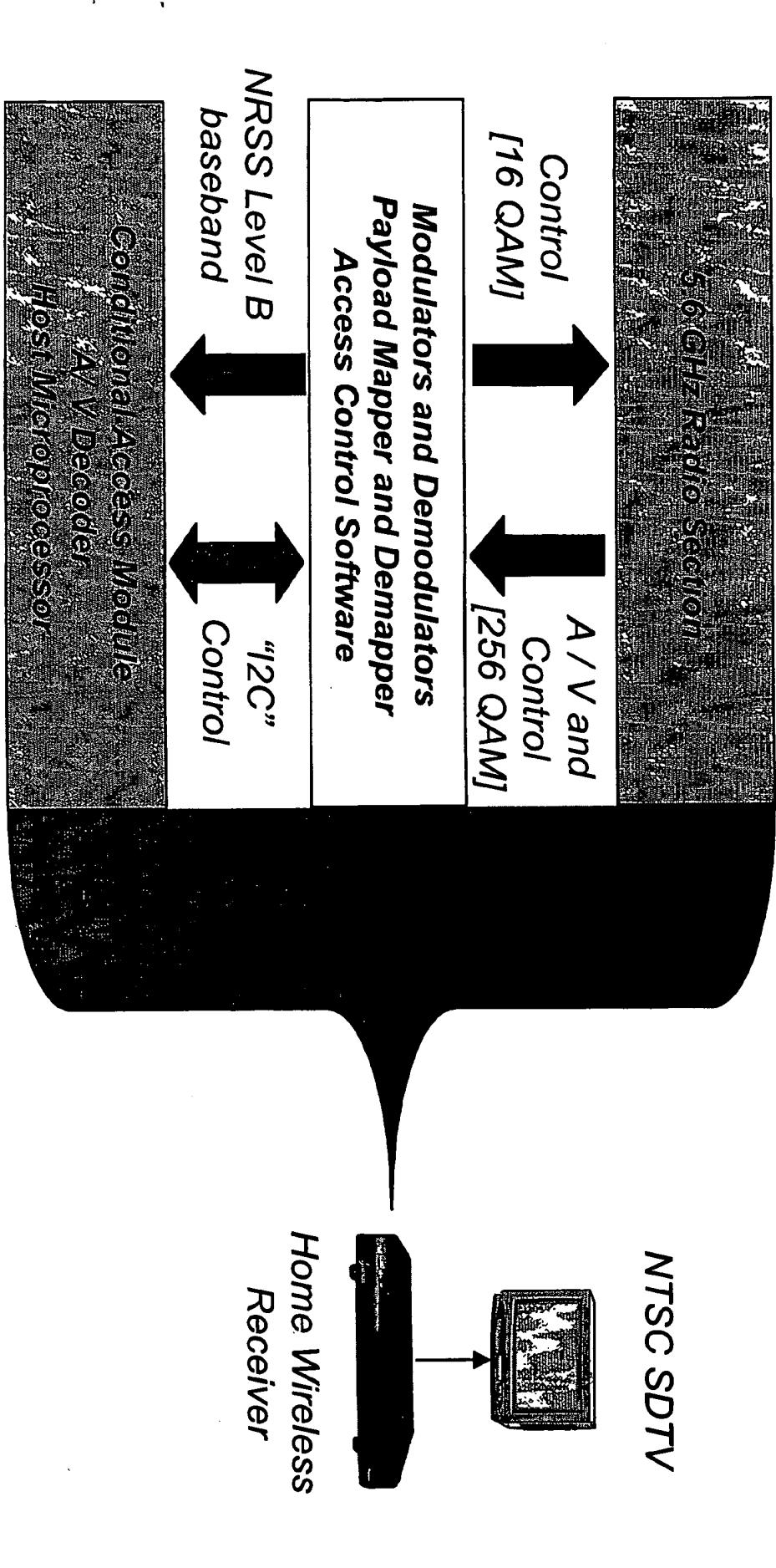
Glossary

Horizontally and Vertically Polarized Signals Spatial Diversity Combiner



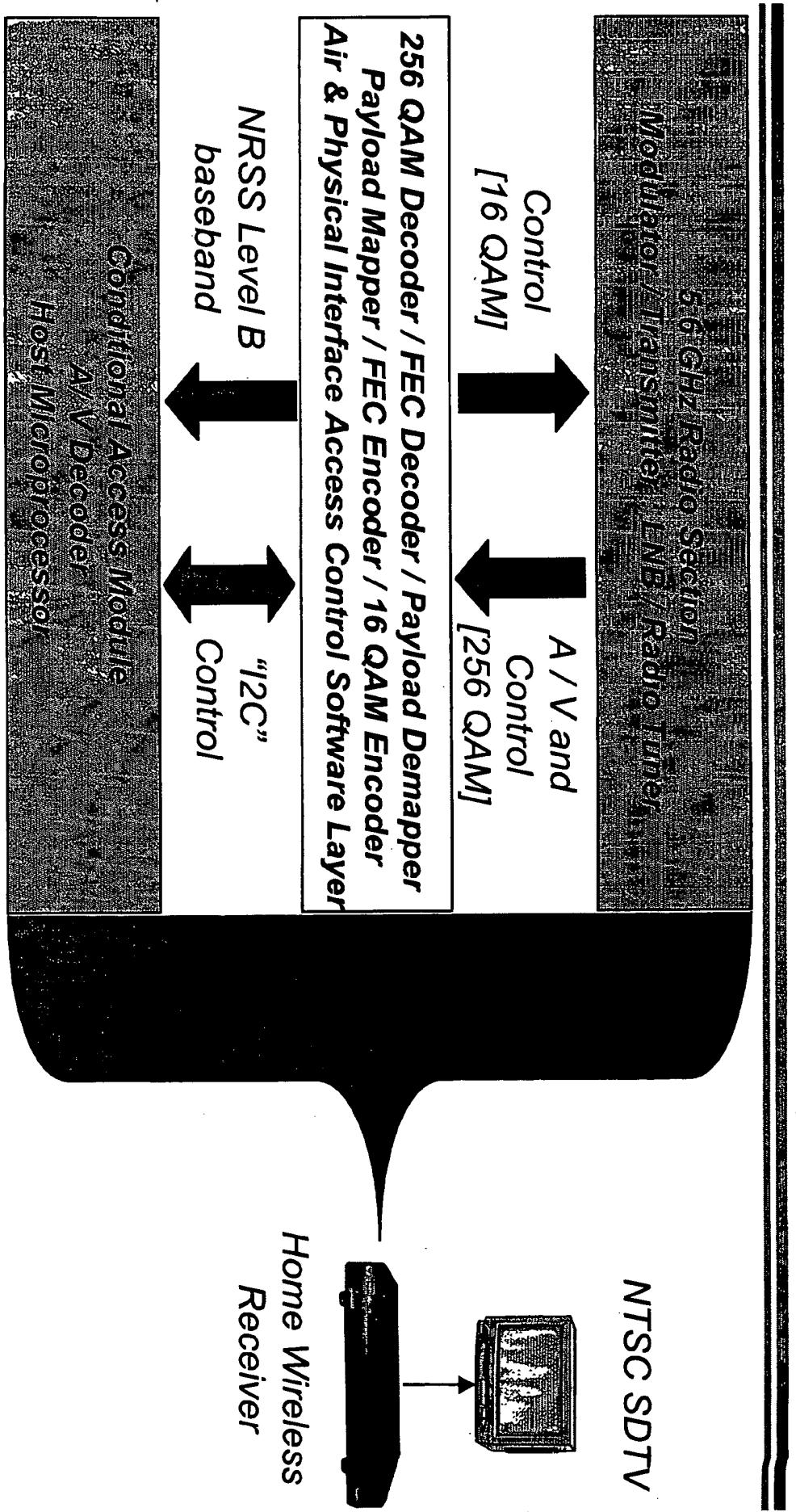
DTV Receiver Node

Fig 11



DTV Receiver Node

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QAM Meets System Requirements

FIG. 13

- » Data rate: For handling DBS HDTV feeds, channel data rates must approach 40 Megabits/sec.
- » Low cost (<\$50 retail adder per node): The overall system architecture must intrinsically enable “low cost.”
- » Near neighbor interference: The total number of available channels must be large enough such that “near neighbors” in apartments, town homes, condos, etc., do not interfere with each other.

Why Not COFDM?

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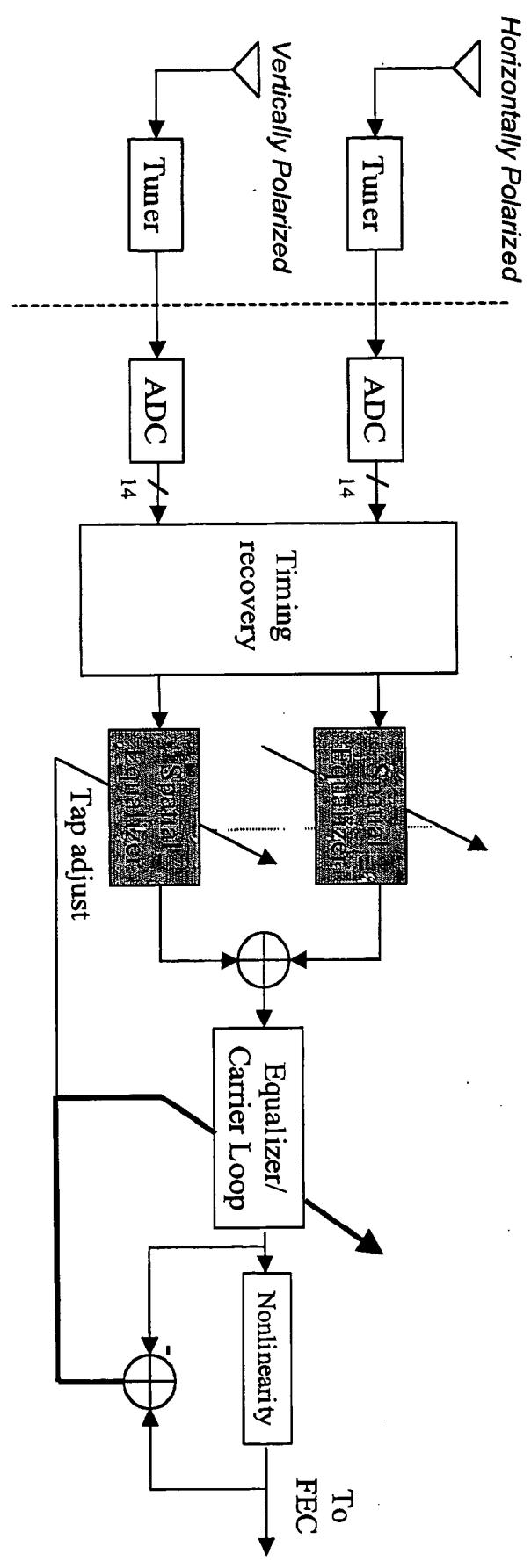
- » What COFDM does:
 - Robust in dealing with multipath.
 - But COFDM trades-off multipath for increased bandwidth.
- » Larger bandwidth:
 - Introduces stringent demands on the RF circuit designer, and the selection of A/D and D/A signal conversion components [phase noise and linearity].
 - Reduces available channels by 50% -- opens the door wider to potential interference between "near neighbors."
- » Increased cost:
 - Higher peak power handling for radios.
 - Higher resolution signal converters.
 - Logic gate counts increased by about 1.5X.

Handling In-Home Multipath with QAM

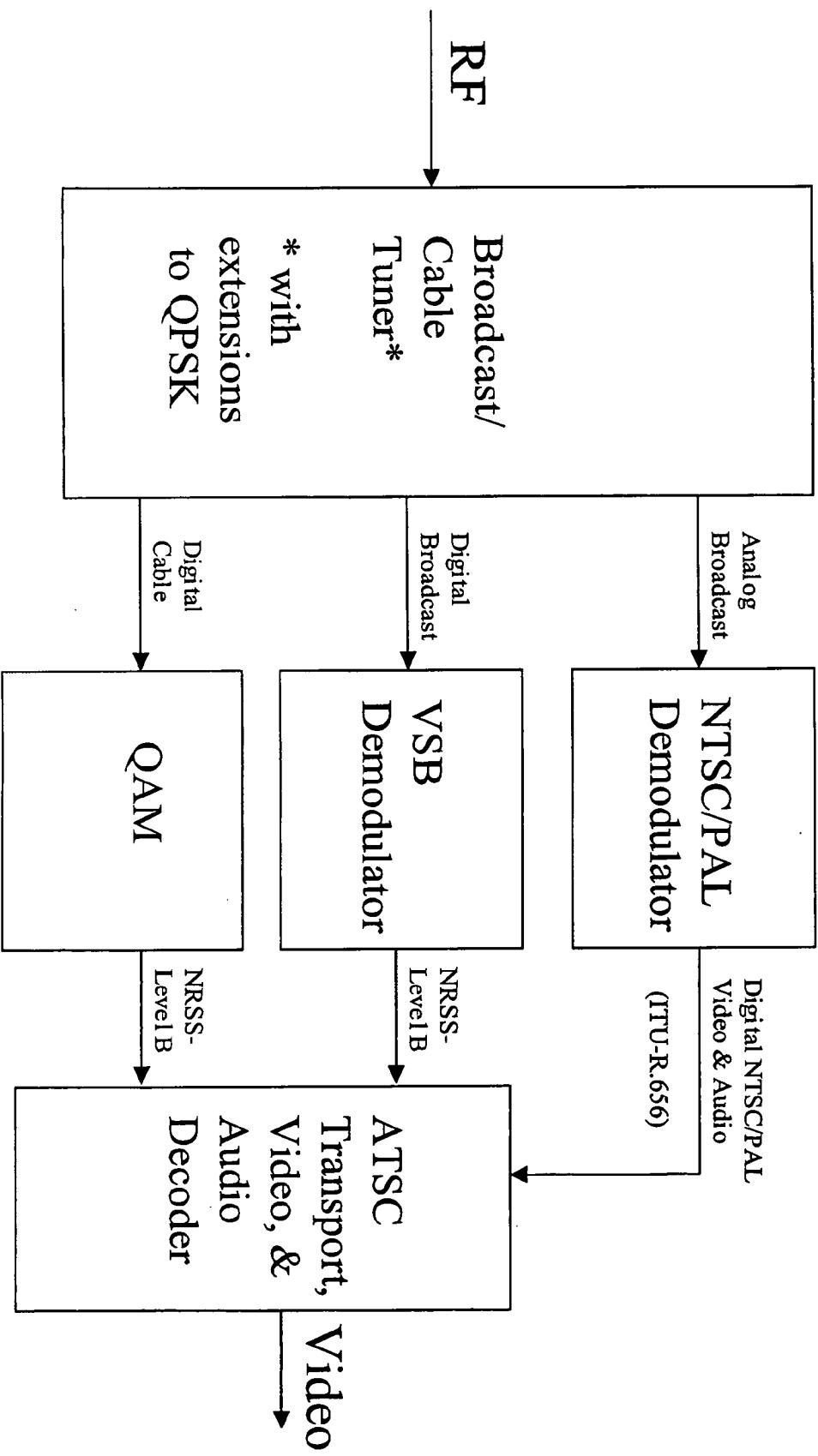
F16/15

- » Increase channel bandwidth on the order of 20%:
 - Increasing channel bandwidth from 6MHz to a little over 7MHz may enable demodulators to deal with higher levels of multipath.
- » Reduce the modulation system to 128- or 64-QAM:
 - Reducing size of symbol constellation increases symbol spacing and thus enhances system's ability to deal with elevated channel noise.
 - To maintain 40 Mbps channel rates, must increase bandwidth by ~30%.

Spatial Diversity Combiner File 16



Discrete Tuner Technology

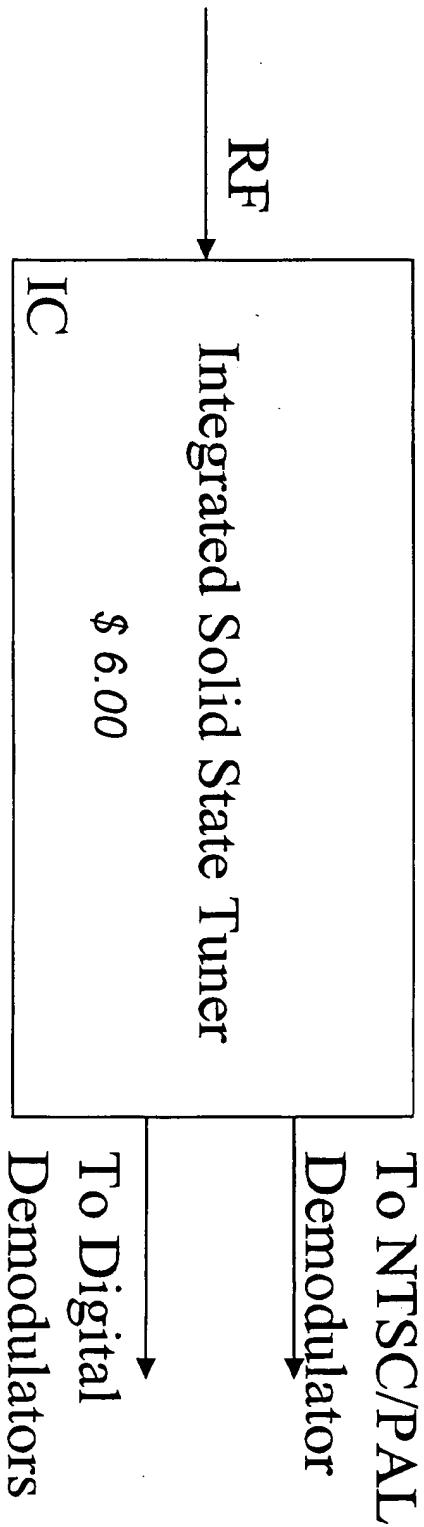


Solid State Tuner

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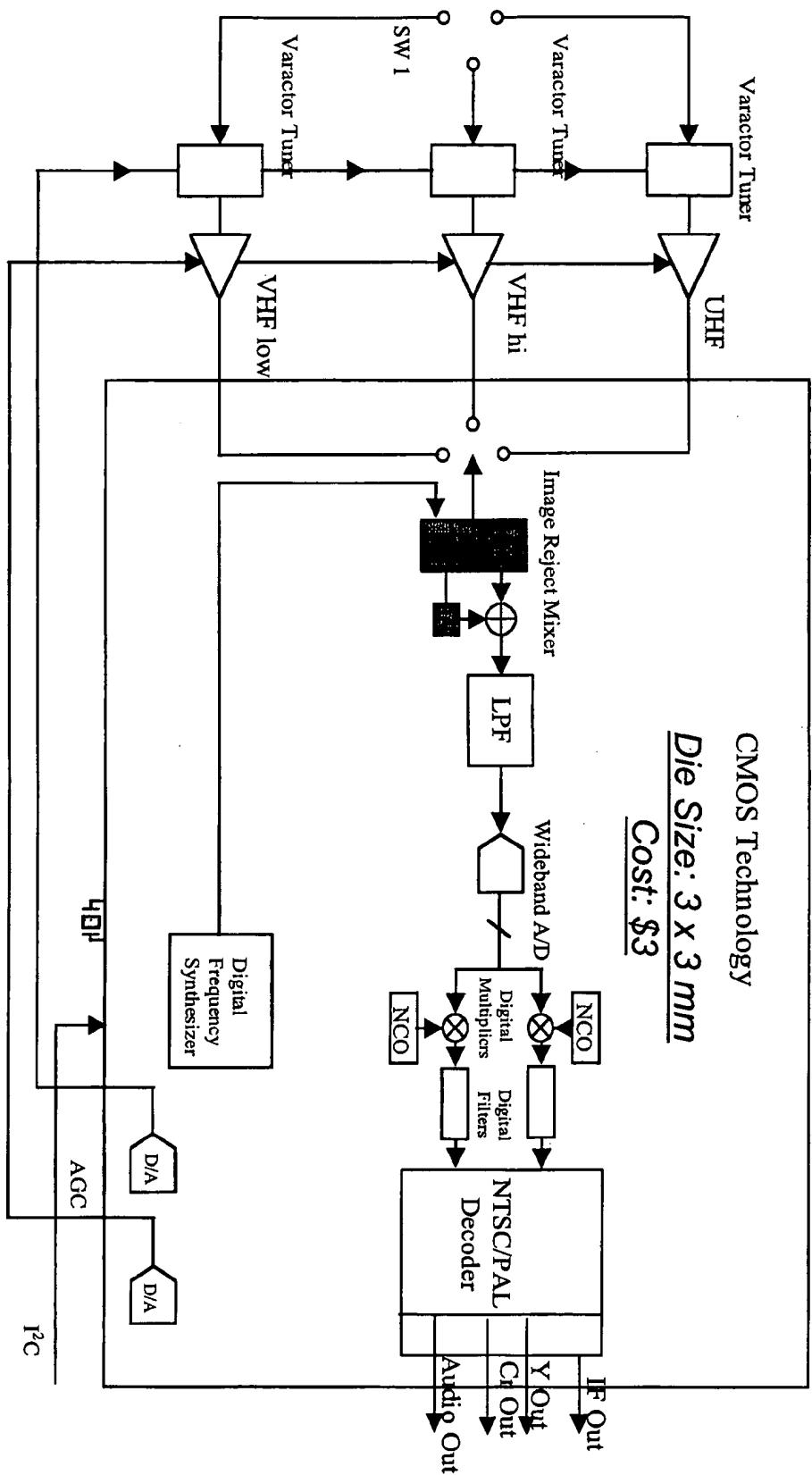
- A Single IC:

- » RF input and digital outputs to NTSC/PAL and VSB/QAM Digital Demodulators
- » 2H '00 product introduction



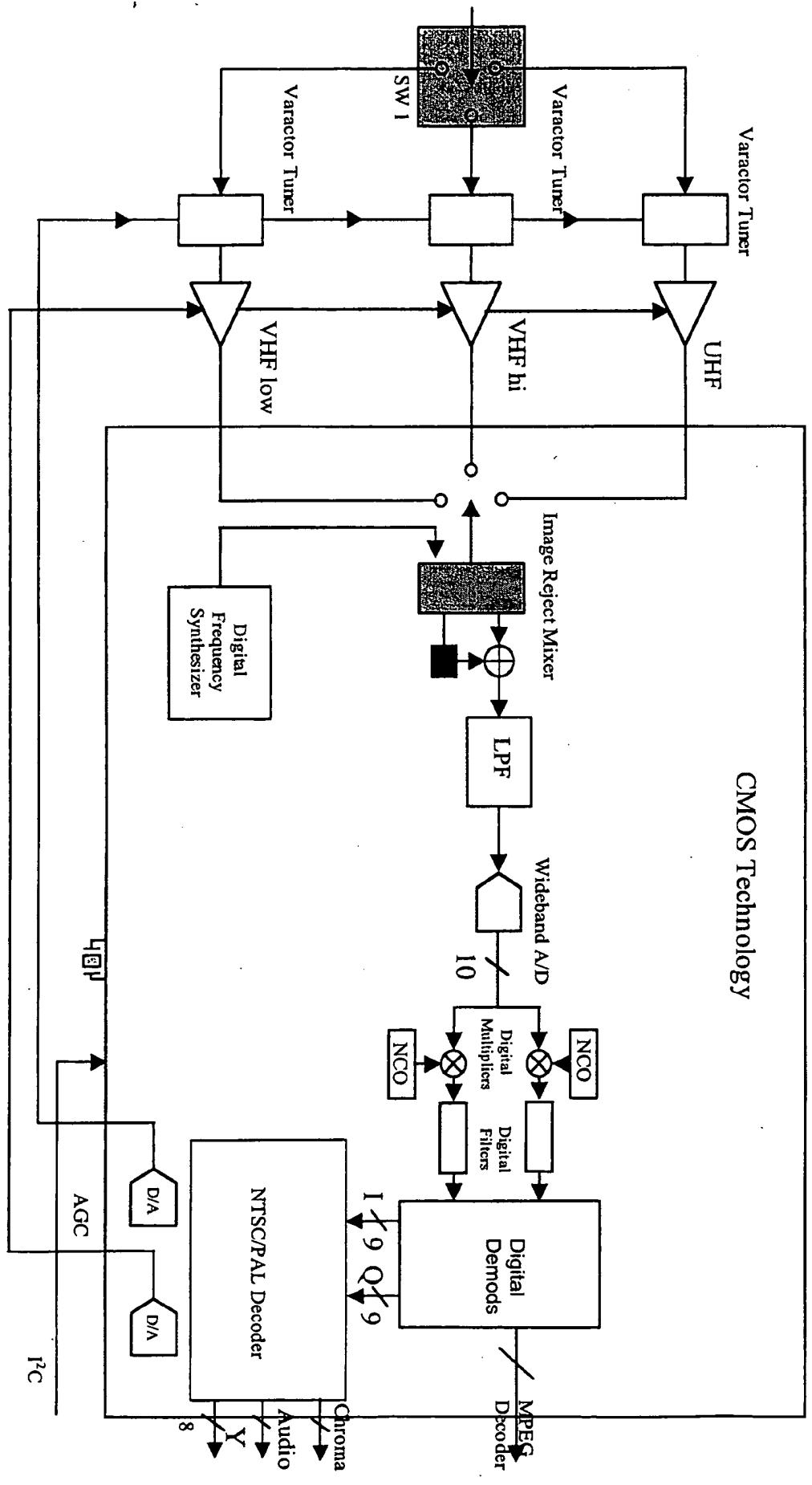
CMOS Solid State Tuner

Fig. 19



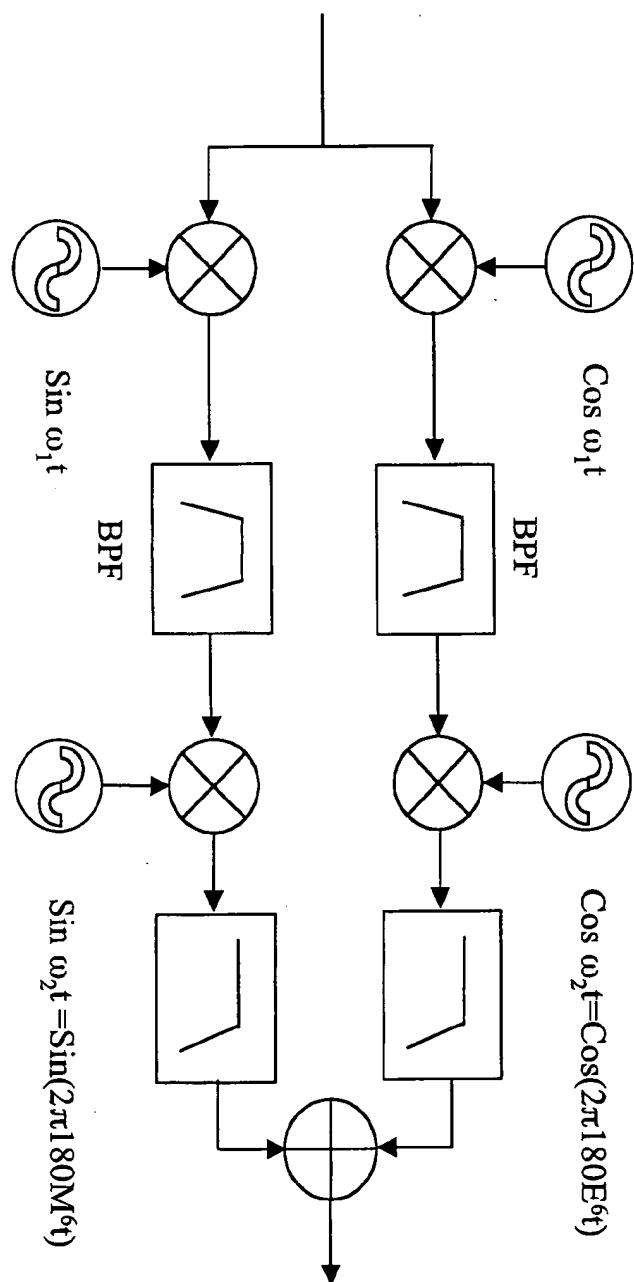
Adding QAM Digital Demodulators

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Mixer Architecture

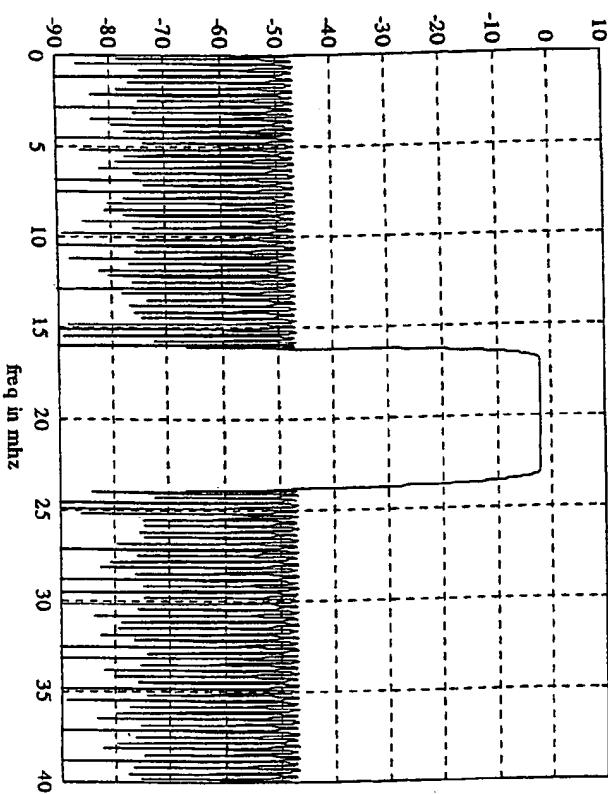
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Digital Band Pass Filters

F | 6 22

Frequency Response of Digital SAW Filter



F 1623

Tuner Mixer
First Silicon Results

Mixer Performance

F1624

- +3 dB_m IP₃
– +5 to +10 dB_m IP₃ in second silicon
- 35 dB of Local Oscillator reverse isolation
- > 30 dB of Local Oscillator suppression
- > 60 dB of on channel suppression

Mixer Performance

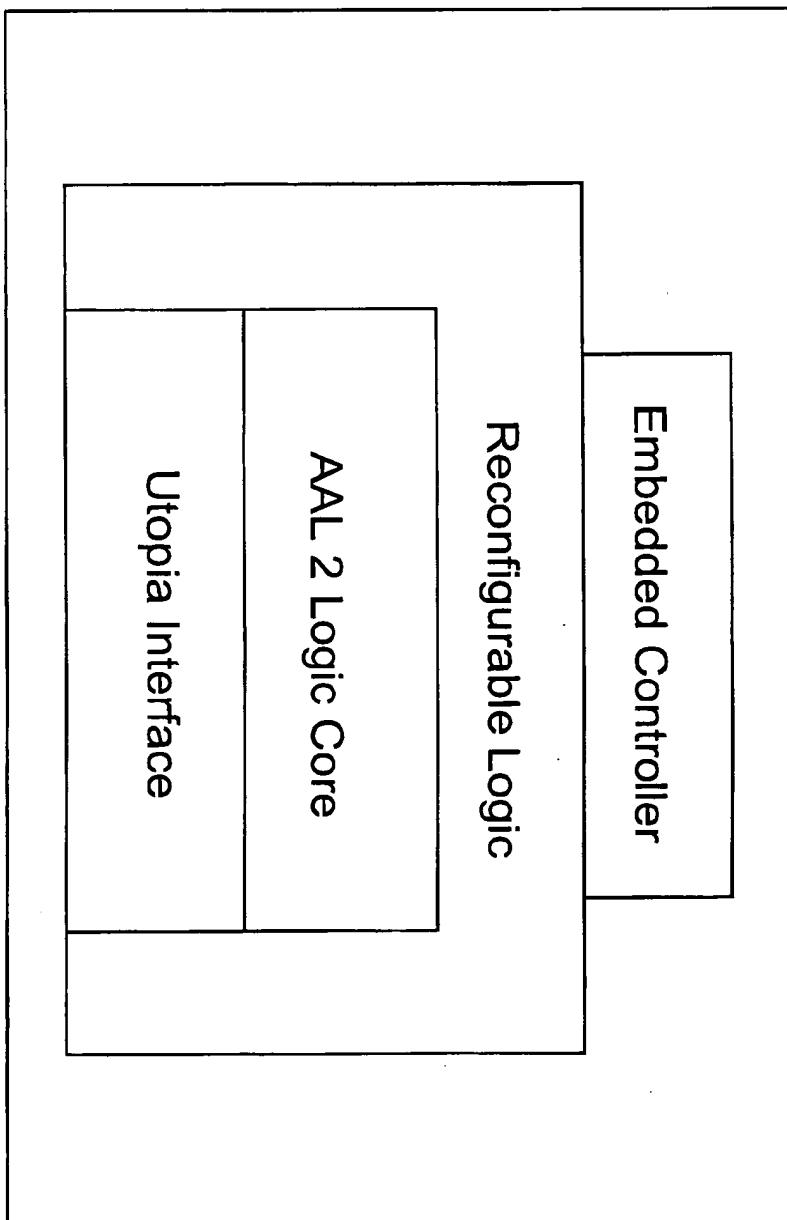
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- Conversion Capability:
beyond 1.1 GHz
- Conversion Gain:
5 - 10dB
- ESD on RF Pads:
2kV

Appendix I

Reconfigurable ATM Adaptation Layer 2 Router

F1626



Appendix I

Reconfigurable ATM Adaptation Layer 2 Router (Continued)

- The AAL 2 core is the heart of the RAAL 2 Router
- Programmable, or reconfigurable, logic surrounds the core
- Programming is accomplished through the embedded processor unit
- As the home network changes and/or market trends drive hardware and networking technologies, the RAAL 2 device can adapt and scale its capability meet a wider range demands.